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COMMISSION

Gwen R. Pinson, Executive Director  
Kentucky Public Service Commission  
211 Sower Boulevard  
Frankfort, KY 40601

**Louisville Gas and Electric  
Company**  
State Regulation and Rates  
220 West Main Street  
PO Box 32010  
Louisville, Kentucky 40232

March 29, 2018

Rick E. Lovekamp  
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**RE: *The Application of Louisville Gas and Electric Company for Approval  
of a Permanent Statistical Meter Sampling Plan***

**Case No. 2000-00278**

**And**

***The Application of Louisville Gas and Electric Company to Implement a  
Gas Regulator Inspection Program***

**Case No. 2012-00491**

Dear Ms. Pinson:

Enclosed please find Louisville Gas and Electric Company's 2017 Gas Meter Performance Control Plan and Residential Gas Regulator Performance Control Program pursuant to the Commission's Orders in the above mentioned proceedings.

Should you have any questions concerning the enclosed, please contact me at your convenience.

Sincerely,

Rick E. Lovekamp

Enclosure

**LG&E**

**Gas Meter Sampling Plan Results**

# Louisville Gas and Electric Company (LG&E) Year 2017 Gas Meter Sampling Plan Results

## I. Introduction

The 2017 LG&E Gas Meter Performance Control Program required 5,983 gas meters within 121 control groups be tested and their accuracy performance documented. There were 5,955 meters removed and tested, 28 meters remained in-service and are included in prior year failed meter control groups for 2014 4XEMCO, 23 meters remaining, and 2013 10MEMCO, 5 meters remaining. Both groups will be exhausted in 2018.

Any sampled meter which proof tested beyond +/- 2% (fast or slow) was considered to be a failed meter. Of the control groups sampled during 2017, zero control groups failed the sampling criteria. This report summarizes the results of the 2017 LG&E Gas Meter Sampling Program.

## II. Meter Performance

The meter groups were separated into three capacity classifications: Meters with capacities up to and including 500 CFH (cubic feet per hour) are primarily Residential meters), meters with capacities ranging from 501 CFH to 1500 CFH are primarily Commercial meters, and meters with capacities greater than 1500 CFH are primarily Industrial meters. Table 1 summarizes control groups and meters by each capacity classification.

**Table 1: Summarized Gas Meter Sampling Program**

Capacity Classification	Total Control Groups*	Total Meters Targeted*	Actual Meters Tested*
Class <500 CFH			
Single Sampling	6	639	639
Reduced Sampling	75	4,284	4,284
Class 501-1500 CFH	30	947	947
Class 1501+ CFH	10	113	85
Total for all Control Groups	121	5,983	5,955

\*Includes all Control Groups and Meters including Exhaust, Prior, and Prior Year Failed Meter Control Groups

A summary of each control group, along with statistical analysis data, is shown in Appendix A. The sample control groups are arranged from low to high capacity. The definitions of selected statistical categories including the reasons for not testing a particular meter are included.

Beginning in the 2003 test year, all Commercial and Industrial Class Control Groups, regardless of whether they meet the Limit Numbers For Reduced Inspection, Table 8, under the American Standard – Sampling Procedures and Tables For Inspection By Attributes guidelines, have been placed on the Single Sampling Plan For Normal Inspection due to the small volume of meters in the Commercial Class Control Groups.

In the 2017 sampling program, 111 of the 121 control groups passed the sampling criteria. There were three (3) control groups containing 3 meters reported as Prior, three (3) control groups containing 44 meters reported as Prior Year Failed Meter control groups, and four (4) control groups containing 289 meters reported as 2017 Exhaust Meter control groups.

A total of eight (8) control groups had their remaining population removed through the sampling program in 2017. Table 2 lists the control groups that were completed.

Table 2 – 2017 Completed Control Groups

Manufacture	Meter Code	Meter Type	Meter Year
American	014	AL1000	2007
American	019	AL1400	2007
Rockwell	058	R750	2007
American	076	AL800	2007
Rockwell	028	4XEMCO	2010
Rockwell	028	4XEMCO	2011
Rockwell	028	4XEMCO	2012
Rockwell	061	10MEMCO	2011

**Residential Class - Up to and including 500 CFH**

The stronger performing meter control groups in this capacity continue to be the American AL175, AC250, and the AL425 models. The models will remain on Residential Reduced Sampling. The Actaris/Itron Metris 250 meter will remain on Residential Single Sampling. Table 3 summarizes the 2017 Fail Rate for each model.

Table 3 - Residential Fail Rate Summary\*

Model Type	Total Control Groups	Sample Size	Total Failure	Fail Rate
AL175	31	1886	32	1.70%
AC250	27	1854	15	0.81%
AL425	17	544	9	1.65%
250	6	639	24	3.76%

\*Does not include Exhaust, Prior, or Prior Failed Meter Control Groups

Residential Reduced Sampling Requirements

Test results from year 2017 were analyzed for the American AL175, AC250, and the AL425 models to verify each model did not exceed the Limit Numbers for Reduced Inspection, Table 8, under the American Standard – Sampling Procedures and Tables for Inspection by Attributes guidelines. Table 4 confirms the models can remain on Reduced Sampling.

Table 4 - Residential Reduced Sampling Requirement

	Model Type/Code		
	AL175 - 033 & 033A	AC250 - 078	AL425 - 015
10 Oldest Control Groups - Tested Meters	614	554	320
Reduced Testing Limit*	25	25	14
Actual Deviate Meters	11	5	6

\*54.10 Gas Meter Performance Control Group

Due to historical performance, all Rockwell R175 meters (meter codes 024, 024T, and 024B) have been removed from sampling and are currently being removed in total with a target completion of December 2019. Table 5 summarizes 2017 results of the Rockwell R175 project.

**Table 5 – Rockwell 175 (R175) Meter Replacement Project**

Year	Beginning Balance	Meters Removed & Tested	Meters Removed & DNR	Ending Balance	Within Tolerance	Failed Meters - Slow	Failed Meters - Fast	Total Failed Meters	Fail Rate (Slow/Fast)
2017	52,593	3,566	233	48,794	3,392	96	78	174	4.88%

**Commercial Class - 501 CFH up to and including 1500 CFH**

In general, with zero control groups failing this year, the hanging diaphragm commercial class control groups continue to fall within sampling tolerance levels. Table 6 summarizes the Fail Rate for each model.

**Table 6 - Commercial Fail Rate Summary\***

Model Type	Total Control Groups	Total Sample	Total Failure	Fail Rate
R750	7	230	1	0.43%
AL800	7	90	3	3.33%
AL1000	7	356	19	5.34%
AL1400	5	16	1	6.25%

\*Does not include Exhaust, Prior, or Prior Failed Meter Control Groups  
 4 Control Groups were fully exhausted in 2017

Due to historical performance, all #3 EMCO meters (meter codes 056) have been removed from Sampling and are currently being removed in total. Table 7 recaps meters that were removed and tested.

**Table 7 - #3 EMCO Pad Meters Fail Rate Summary**

Year	Beginning Balance	Meters Removed & Tested	Meters Field Tested	Meters Removed & DNR	Ending Balance	Within Tolerance	Failed Meters - Slow	Failed Meters - Fast	Total Failed Meters	Fail Rate (Slow/Fast)
2017	251	59	42	1	191	71	24	6	30	29.70%

**Industrial Class - Over 1500 CFH**

Industrial pad meter results continue to fluctuate year to year. As a result, pad meters are targeted for full replacement with a projected completion year of 2024. Table 8 summarizes the Fail Rate for the #4 and #10 EMCO pad meters.

**Table 8 - Industrial Fail Rate Summary\***

Model Type	Total Control Groups	Total Sample	Total Failure	Fail Rate
4XEMCO	2	26	2	7.69%
10MEMCO	2	10	0	0.00%

\*Does not include Exhaust, Prior, or Prior Failed Meter Control Groups  
 3 Control Groups were fully exhausted in 2017  
 2 Failed Meter Control Groups (2016) will rollover into 2018 for completion

**Failed Meter Control Groups Exhausted in 2017 Summary**

The failed 2007 AL1400 meter control group reported in 2016 results was completely exhausted in 2017. Table 9 summarizes the failed meter group.

**Table 9: Failed Meter Group(s) Exhausted in 2017**

American AL1400 2007 Control Group (Failed Meter Group Reported in 2016)										
Year	Beginning Balance	Meters Removed and Tested	Meters Removed and DNR	Ending Balance		Within Tolerance	Failed Meters - Slow	Failed Meters - Fast	Total Failed Meters	Fail Rate (Slow/Fast)
2016	6	2	0	4		1	1	0	1	50.00%
2017	4	3	1	0		3	0	0	0	0.00%
Recap	6	5	1	0		4	1	0	1	20.00%

**Prior Meters**

There are no Prior Meters rolling into 2018.

**III. Safety**

As part of the LG&E Meter Sampling change-out activities, safety inspections were performed and “red-tags” were issued when deficiencies were found which resulted in a customer’s appliance being left off, branch line from the customer’s gas service left off, or the entire customer’s gas service left off until the deficiency was corrected by the customer or by LG&E. The results of these safety inspections that are directly associated with LG&E’s Meter Sampling Program are summarized in Table 10 below.

**Table 10: Year 2017 Safety Inspection**

Appliance Red Tag	Total
Clothes Dryer	1
Cook Stove	3
Fireplace	1
Furnace	23
Houeline	1
Space Heater	1
Water Heater	17
<b>Total</b>	<b>47</b>

Additionally, Surveillance Notices were issued to correct outside deficiencies. Said deficiencies will be corrected by either the customer or by LG&E depending on ownership. The results of these surveillances directly associated with LG&E's Meter Sampling Program are summarized in Table 11 below.

**Table 11: Year 2017 Customer Surveillance Notices Issued**

Type Of Customer Notice Issued	Number Issued
Corrosion / Rust On Outside Meter Loop & Associated Piping	177
Gas Piping Not Properly Supported	60
Tree / Shrubbery Growing Inside / Against Meter Loop	16
Meter Not Protected From Vehicular Damage	7
Meter Loop Too Low - In Contact With Soil / Pavement	8
No Plastic Sleeve Around Riser Going Through Pavement	0
Other	46
<b>Total</b>	<b>314</b>

#### IV. Year 2017 Residential Meter Sampling Savings

Table 12 highlights the estimated savings between a periodic change schedule and the LG&E Gas Meter Performance Control Program for the purchase of new/remanufactured residential class gas meters.

**Table 12: 2017 Residential Class Meter Sampling Program Estimated Savings**

<b>Meter Purchase Savings: Residential Gas Meters</b>	
Periodic Program Costs (10-year Program):	
Number of Meters under Periodic Program [1]	27,420
Unit Remanufacture Cost – Average Blended Cost	\$37.21
<b>Residential Meter Costs Under Periodic Program</b>	<b>\$1,020,298</b>
Sampling Program Costs:	
Number of Meters Tested under Sampling Program	4,923
Number of poor performing meters scrapped	639
<b>Number of Meters for Remanufacture</b>	<b>4,284</b>
Remanufactured Meters	4,284
Average Unit Remanufacture Cost – All Models	\$37.21
<b>Remanufactured Meter Costs</b>	<b>\$159,408</b>
Replacement Meters for Meters Scrapped	639
Average Replacement Meter Cost (per unit)	\$58.50
<b>Replacement Meter Costs</b>	<b>\$37,382</b>
<b>Total Residential Meter Costs Under 2017 Program</b>	<b>\$196,790</b>
<b>Meter Cost Savings From 2017 Program</b>	<b>\$823,508</b>

[1] Based on residential meters In-service at beginning of year; removed all Rockwell R175 from analysis

# APPENDIX A

## Control Group Data/Analysis

### Statistical Definitions

#### MEAN

The mean is the average of all numbers.

#### STANDARD DEVIATION

The standard deviation is a measure of how widely values are dispersed from the average value (the mean).

#### SAMPLE MINIMUM AND MAXIMUM

The minimum and maximum are the values of the least and greatest elements in a sample.

### Notes and Acronyms Explanation

#### Prior

Prior indicates that a gas meter is out of compliance with its life expectancy. Meter lots will be listed as “prior” until all remaining meters in a particular lot are removed.

#### Exhaust

Exhaust indicates that the gas meter lot has reached its life expectancy and all meters were removed.

#### Missing

Missing indicates that a gas meter in the lot cannot be found and will be excluded from future sample selections.

#### Exh/Miss (Exhaust/Missing)

Exh/Miss indicates that the gas meter control group has reached its life expectancy and contained a meter that is missing.

#### Exh/CGI (Exhaust/Can't Get In)

Exh/CGI indicates that the gas meter control group has reached its life expectancy and contained a gas meter with no access.

#### FM (Failed Meter Control Group)

FM indicates failed meter control group followed in parenthesis by the date the meter control group failed.

#### NT-Prior (No Test, Prior)

NT-Prior indicates meter removed, but no test for a meter that was out of compliance with its life expectancy.

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

CAPACITY <=500CFH

### SINGLE SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum		
Schlumberger	018	250	2000	483	50	Single	50	50	7	8	1	1	2	0.13	0.82	-2.35	2.10	Pass	
Schlumberger	018	250	2001	236	32	Single	32	32	5	6	0	0	0	0.31	0.52	-0.70	1.20	Pass	
Schlumberger	018	250	2002	2573	125	Single	125	125	14	15	3	0	3	-0.46	0.82	-2.55	1.55	Pass	
Schlumberger	018	250	2003	3578	200	Single	200	200	21	22	5	1	6	-0.56	0.86	-3.40	4.50	Pass	
Schlumberger	018	250	2004	3551	200	Single	200	200	21	22	9	2	11	-0.36	1.02	-3.90	2.30	Pass	
Schlumberger	018T	250	2002	199	32	Single	32	32	5	6	1	1	2	-0.35	1.03	-3.75	2.75	Pass	
6	250 Control Groups			10620	639		639	639			19	5	24						
<500 CFH Totals				10620	639		639	639			19	5	24						
6	Total Control Groups																		

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

CAPACITY <=500CFH

### REDUCED SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum		
American	078	AC250	1985	620	32	Reduced	32	32	5	8	0	0	0	0.52	0.56	-0.70	1.60	Pass	
American	078	AC250	1986	3140	50	Reduced	50	50	7	10	1	1	2	0.30	0.89	-2.80	2.55	Pass	
American	078	AC250	1987	2869	50	Reduced	50	50	7	10	0	1	1	-0.25	0.63	-1.35	2.05	Pass	
American	078	AC250	1988	3298	80	Reduced	80	80	10	13	0	1	1	-0.13	0.56	-1.70	2.25	Pass	
American	078	AC250	1989	2561	50	Reduced	50	50	7	10	0	0	0	-0.38	0.44	-1.35	0.45	Pass	
American	078	AC250	1990	3445	80	Reduced	80	80	10	13	0	0	0	-0.04	0.62	-1.95	1.55	Pass	
American	078	AC250	1991	2147	50	Reduced	50	50	7	10	0	0	0	-0.45	0.55	-1.60	1.10	Pass	
American	078	AC250	1993	353	32	Reduced	32	32	5	8	0	0	0	0.37	0.64	-1.15	1.50	Pass	
American	078	AC250	1994	1868	50	Reduced	50	50	7	10	1	0	1	0.23	0.82	-4.40	1.55	Pass	
American	078	AC250	1995	3599	80	Reduced	80	80	10	13	0	0	0	0.33	0.57	-1.35	1.40	Pass	
American	078	AC250	1996	8396	80	Reduced	80	80	10	13	0	0	0	0.20	0.52	-1.40	1.20	Pass	
American	078	AC250	1997	7673	80	Reduced	80	80	10	13	0	0	0	0.47	0.57	-0.90	1.50	Pass	
American	078	AC250	1998	5702	80	Reduced	80	80	10	13	0	0	0	0.31	0.52	-1.05	1.40	Pass	
American	078	AC250	1999	3994	80	Reduced	80	80	10	13	0	0	0	0.26	0.50	-1.20	1.35	Pass	
American	078	AC250	2000	4845	80	Reduced	80	80	10	13	0	1	1	0.32	0.54	-1.30	3.15	Pass	
American	078	AC250	2001	4602	80	Reduced	80	80	10	13	0	0	0	0.35	0.39	-0.40	1.65	Pass	
American	078	AC250	2002	1978	50	Reduced	50	50	7	10	0	0	0	0.30	0.50	-0.60	1.40	Pass	
American	078	AC250	2003	1702	50	Reduced	50	50	7	10	0	0	0	0.10	0.52	-1.50	1.90	Pass	
American	078	AC250	2004	3299	80	Reduced	80	80	10	13	0	4	4	0.73	0.89	-1.45	2.25	Pass	
American	078	AC250	2005	6650	80	Reduced	80	80	10	13	0	0	0	0.72	0.65	-1.05	1.95	Pass	
American	078	AC250	2006	5736	80	Reduced	80	80	10	13	0	2	2	0.64	0.65	-1.75	2.30	Pass	

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

CAPACITY <=500CFH

### REDUCED SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum		
American	078	AC250	2007	4793	80	Reduced	80	80	10	13	0	1	1	0.63	0.49	-0.55	2.10	Pass	
American	078	AC250	2008	6416	80	Reduced	80	80	10	13	0	1	1	0.63	0.55	-0.45	2.30	Pass	
American	078	AC250	2009	6403	80	Reduced	80	80	10	13	0	1	1	0.36	0.74	-1.95	2.65	Pass	
American	078	AC250	2011	4447	80	Reduced	80	80	10	13	0	0	0	-0.06	0.48	-1.55	1.00	Pass	
American	078	AC250	2013	4274	80	Reduced	80	80	10	13	0	0	0	0.26	0.39	-1.00	1.05	Pass	
American	078	AC250	2015	7867	80	Reduced	80	80	10	13	0	0	0	0.12	0.33	-0.80	1.00	Pass	
27	AC250 Control Groups			112677	1854		1854	1854			2	13	15						
American	033	AL175	1985	849	32	Reduced	32	32	5	8	0	0	0	0.45	0.59	-0.75	1.90	Pass	
American	033	AL175	1986	1318	50	Reduced	50	50	7	10	0	2	2	0.33	0.74	-1.05	2.55	Pass	
American	033	AL175	1987	566	32	Reduced	32	32	5	8	0	0	0	0.34	0.57	-1.60	1.50	Pass	
American	033	AL175	1988	2950	50	Reduced	50	50	7	10	1	1	2	0.30	0.72	-2.55	2.15	Pass	
American	033	AL175	1989	1704	50	Reduced	50	50	7	10	0	0	0	0.49	0.48	-0.35	2.00	Pass	
American	033	AL175	1990	5510	80	Reduced	80	80	10	13	1	3	4	0.28	0.94	-2.60	3.90	Pass	
American	033	AL175	1991	6830	80	Reduced	80	80	10	13	0	1	1	0.70	0.58	-0.60	2.05	Pass	
American	033	AL175	1992	6599	80	Reduced	80	80	10	13	1	0	1	0.41	0.92	-5.60	1.80	Pass	
American	033	AL175	1993	6654	80	Reduced	80	80	10	13	1	0	1	0.35	0.75	-2.95	2.00	Pass	
American	033	AL175	1994	6958	80	Reduced	80	80	10	13	1	0	1	0.29	0.73	-4.60	1.65	Pass	
American	033	AL175	1995	6900	80	Reduced	80	80	10	13	0	0	0	0.11	0.65	-1.95	2.00	Pass	
American	033	AL175	1996	4212	80	Reduced	80	80	10	13	0	3	3	0.09	0.81	-1.65	3.00	Pass	
American	033	AL175	1997	8150	80	Reduced	80	80	10	13	0	1	1	0.32	0.66	-0.90	2.10	Pass	
American	033	AL175	1998	4807	80	Reduced	80	80	10	13	0	0	0	-0.02	0.57	-1.65	1.30	Pass	

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

CAPACITY <=500CFH

### REDUCED SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum		
American	033	AL175	1999	7433	80	Reduced	80	80	10	13	0	1	1	0.25	0.66	-1.20	2.40	Pass	
American	033	AL175	2000	6738	80	Reduced	80	80	10	13	2	3	5	0.30	1.08	-4.65	3.15	Pass	
American	033	AL175	2001	3673	80	Reduced	80	80	10	13	0	1	1	0.05	0.72	-1.95	2.95	Pass	
American	033	AL175	2002	2256	50	Reduced	50	50	7	10	1	1	2	-0.26	0.74	-2.05	2.50	Pass	
American	033	AL175	2003	2280	50	Reduced	50	50	7	10	1	1	2	-0.02	0.75	-2.60	2.25	Pass	
American	033	AL175	2004	1739	50	Reduced	50	50	7	10	1	1	2	-0.31	0.89	-2.85	2.60	Pass	
American	033	AL175	2005	1862	50	Reduced	50	50	7	10	0	0	0	-0.15	0.59	-1.35	1.35	Pass	
American	033	AL175	2006	1159	32	Reduced	32	32	5	8	0	0	0	0.01	0.70	-1.30	1.45	Pass	
American	033	AL175	2007	2957	50	Reduced	50	50	7	10	0	0	0	-0.08	0.68	-1.60	1.40	Pass	
American	033	AL175	2008	1755	50	Reduced	50	50	7	10	0	0	0	0.11	0.66	-1.80	1.50	Pass	
American	033	AL175	2009	2505	50	Reduced	50	50	7	10	0	0	0	-0.05	0.61	-1.90	1.30	Pass	
American	033	AL175	2011	2966	50	Reduced	50	50	7	10	0	0	0	-0.32	0.59	-1.70	1.40	Pass	
American	033	AL175	2013	3151	50	Reduced	50	50	7	10	0	0	0	-0.11	0.49	-1.85	0.75	Pass	
American	033	AL175	2015	2649	50	Reduced	50	50	7	10	0	0	0	-0.05	0.46	-1.20	1.20	Pass	
American	033A	AL175	1992	4096	80	Reduced	80	80	10	13	0	0	0	0.30	0.68	-1.55	2.00	Pass	
American	033A	AL175	1993	1527	50	Reduced	50	50	7	10	0	2	2	0.39	0.68	-1.30	2.60	Pass	
American	033A	AL175	1994	2105	50	Reduced	50	50	7	10	0	1	1	0.40	0.67	-1.10	2.10	Pass	
31	AL175 Control Groups			114858	1886		1886	1886			10	22	32						
American	015	AL425	1996	164	32	Reduced	32	32	5	8	0	0	0	-0.22	0.47	-1.10	1.10	Pass	
American	015	AL425	1997	89	32	Reduced	32	32	5	8	0	0	0	-0.04	0.69	-1.20	1.60	Pass	
American	015	AL425	1998	166	32	Reduced	32	32	5	8	0	1	1	0.03	0.80	-1.15	2.60	Pass	

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

CAPACITY <=500CFH

### REDUCED SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum		
American	015	AL425	1999	71	32	Reduced	32	32	5	8	0	2	2	0.06	1.00	-1.45	2.90	Pass	
American	015	AL425	2000	106	32	Reduced	32	32	5	8	0	1	1	0.00	0.74	-1.70	2.15	Pass	
American	015	AL425	2001	219	32	Reduced	32	32	5	8	1	0	1	0.04	0.62	-2.50	1.15	Pass	
American	015	AL425	2002	49	32	Reduced	32	32	5	8	0	0	0	-0.10	0.54	-1.00	0.85	Pass	
American	015	AL425	2003	70	32	Reduced	32	32	5	8	0	0	0	-0.37	0.45	-1.30	0.65	Pass	
American	015	AL425	2004	132	32	Reduced	32	32	5	8	0	0	0	0.10	0.62	-0.80	1.30	Pass	
American	015	AL425	2005	255	32	Reduced	32	32	5	8	0	1	1	0.31	0.73	-1.00	2.15	Pass	
American	015	AL425	2006	323	32	Reduced	32	32	5	8	0	2	2	0.28	0.94	-1.00	3.25	Pass	
American	015	AL425	2007	294	32	Reduced	32	32	5	8	1	0	1	0.00	0.69	-2.15	1.30	Pass	
American	015	AL425	2008	315	32	Reduced	32	32	5	8	0	0	0	0.02	0.42	-0.80	0.80	Pass	
American	015	AL425	2009	520	32	Reduced	32	32	5	8	0	0	0	0.01	0.46	-0.95	1.00	Pass	
American	015	AL425	2011	498	32	Reduced	32	32	5	8	0	0	0	-0.03	0.45	-0.95	0.65	Pass	
American	015	AL425	2013	589	32	Reduced	32	32	5	8	0	0	0	0.11	0.51	-0.65	1.90	Pass	
American	015	AL425	2015	821	32	Reduced	32	32	5	8	0	0	0	0.02	0.51	-1.00	0.95	Pass	
17	AL425 Control Groups			4681	544		544	544			2	7	9						
<500 CFH Totals				232216	4284		4284	4284			14	42	56						
75 Total Control Groups																			

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

### CAPACITY 501-1500CFH

### SINGLE SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes	
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum			
American	014	AL1000	2007	110	110	Single		110												Exhaust
American	014	AL1000	2008	163	32	Single	32	32	5	6	2	0	2	-0.17	1.06	-2.60	1.70			Pass
American	014	AL1000	2009	208	32	Single	32	32	5	6	3	1	4	-0.63	1.18	-3.60	2.20			Pass
American	014	AL1000	2010	240	32	Single	32	32	5	6	3	0	3	-0.74	1.28	-5.50	0.65			Pass
American	014	AL1000	2011	353	50	Single	50	50	7	8	5	0	5	-0.86	0.89	-3.60	0.40			Pass
American	014	AL1000	2012	313	50	Single	50	50	7	8	1	0	1	-0.25	0.77	-2.05	1.35			Pass
American	014	AL1000	2013	612	80	Single	80	80	10	11	2	0	2	-0.20	0.91	-5.40	1.30			Pass
American	014	AL1000	2015	740	80	Single	80	80	10	11	2	0	2	-0.08	0.70	-3.30	2.00			Pass
8	AL1000 Control Groups			2739	466		356	466			18	1	19							
American	019	AL1400	2007	4	4	Single		4												FM (2016)
American	019	AL1400	2008	3	2	Single	2	2	0	1	0	0	0	-0.25	2.05	-1.70	1.20			Pass
American	019	AL1400	2011	5	2	Single	2	2	0	1	0	0	0	-1.05	1.20	-1.90	-0.20			Pass
American	019	AL1400	2012	13	2	Single	2	2	0	1	0	0	0	-1.70	0.42	-2.00	-1.40			Pass
American	019	AL1400	2013	15	2	Single	2	2	0	1	0	0	0	-1.88	0.04	-1.90	-1.85			Pass
American	019	AL1400	2015	19	8	Single	8	8	1	2	1	0	1	-0.56	1.83	-4.65	1.30			Pass
6	AL1400 Control Groups			59	20		16	20			1	0	1							
American	076	AL800	2007	11	11	Single		11												Exhaust
American	076	AL800	2008	20	8	Single	8	8	1	2	1	0	1	-0.38	1.40	-2.80	1.55			Pass
American	076	AL800	2009	41	8	Single	8	8	1	2	0	0	0	-0.70	0.79	-1.95	0.00			Pass
American	076	AL800	2010	52	13	Single	13	13	2	3	0	0	0	-0.73	0.52	-1.75	-0.10			Pass
American	076	AL800	2011	73	13	Single	13	13	2	3	0	0	0	-0.07	0.96	-1.20	1.65			Pass

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

### CAPACITY 501-1500CFH

### SINGLE SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum		
American	076	AL800	2012	112	20	Single	20	20	3	4	1	0	1	-0.21	0.89	-3.05	1.80	Pass	
American	076	AL800	2013	113	20	Single	20	20	3	4	1	0	1	-0.19	0.97	-2.90	1.60	Pass	
American	076	AL800	2015	24	8	Single	8	8	1	2	0	0	0	-0.08	0.38	-0.70	0.45	Pass	
8	AL800 Control Groups			446	101		90	101			3	0	3						
Rockwell	058	R750	2007	130	130	Single		130											Exhaust
Rockwell	058	R750	2008	141	20	Single	20	20	3	4	0	0	0	0.22	0.76	-1.65	1.40	Pass	
Rockwell	058	R750	2009	153	32	Single	32	32	5	6	0	0	0	0.10	0.79	-1.70	1.70	Pass	
Rockwell	058	R750	2010	165	32	Single	32	32	5	6	0	0	0	0.21	0.95	-1.55	1.90	Pass	
Rockwell	058	R750	2011	222	32	Single	32	32	5	6	1	0	1	0.11	0.82	-2.10	1.40	Pass	
Rockwell	058	R750	2012	205	32	Single	32	32	5	6	0	0	0	0.34	0.83	-1.30	1.90	Pass	
Rockwell	058	R750	2013	275	32	Single	32	32	5	6	0	0	0	0.36	0.61	-1.70	1.85	Pass	
Rockwell	058	R750	2015	342	50	Single	50	50	7	8	0	0	0	0.19	0.51	-1.35	1.25	Pass	
8	R750 Control Groups			1633	360		230	360			1	0	1						
500-1500 CFH Totals				4877	947		692	947			23	1	24						
30 Total Control Groups																			

# LOUISVILLE GAS AND ELECTRIC COMPANY

## GAS METER SAMPLING PLAN - 2017

CAPACITY >1500CFH

### SINGLE SAMPLING PLAN

Manufacture	Type	Model	Install Year	Original Population	Meters Removed	Sampling	Sample Size	Meters Tested	Accept Level	Reject Level	Test Results			Statistics				Lot Status	Notes	
											Slow Failures	Fast Failures	Total Failures	Mean Avg	Standard Deviation	Minimum	Maximum			
Rockwell	061	10MEMCO	2011	1	1	Single		1											Prior	
Rockwell	061	10MEMCO	2013	7	2	Single		2												FM (2016)
Rockwell	061	10MEMCO	2014	11	2	Single	2	2	0	1	0	0	0	0.98	0.25	0.80	1.15		Pass	
Rockwell	061	10MEMCO	2015	25	8	Single	8	8	1	2	0	0	0	-0.24	0.78	-1.05	0.90		Pass	
4 10MEMCO Control Groups				44	13		10	13			0	0	0							
Rockwell	028	4XEMCO	2010	1	1	Single		1												Prior
Rockwell	028	4XEMCO	2011	1	1	Single		1												Prior
Rockwell	028	4XEMCO	2012	34	34	Single		34												Exhaust
Rockwell	028	4XEMCO	2013	77	13	Single	13	13	2	3	0	0	0	-0.34	0.87	-1.45	1.45		Pass	
Rockwell	028	4XEMCO	2014	33	10	Single		10												FM (2016)
Rockwell	028	4XEMCO	2015	75	13	Single	13	13	2	3	1	1	2	0.21	1.44	-3.50	2.60		Pass	
6 4XEMCO Control Groups				221	72		26	72			1	1	2							
>1500 CFH Totals				265	85		36	85			1	1	2							
10 Total Control Groups																				

LG&E

Residential Gas Regulator Performance  
Control Report

# **LOUISVILLE GAS AND ELECTRIC COMPANY 2017 RESIDENTIAL GAS REGULATOR PERFORMANCE CONTROL PROGRAM REPORT**

## **Introduction**

Louisville Gas and Electric Company's Residential Gas Regulator Performance Control Program is a procedure designed to provide a continuous high level of performance of gas regulators while controlling inspection and replacement costs. A summary of the program results are being submitted pursuant to Case No. 2000-00278 and Case No. 2012-00491.

## **General Description of Program**

LG&E's Residential Gas Regulator Performance Control Program leverages LG&E's Gas Meter Performance Control Program to test the protective capability of all classes of residential regulators. Under performance control, LG&E's residential gas regulator population will be classified into homogeneous control groups representing like regulators. A control group would be subject to random sample testing during LG&E's Gas Meter Performance Control Program activities. Specifically, when a meter serving a residential account is tested under the Gas Meter Performance Control Program, the associated regulator will also be tested if one is present.

## **2017 Sampling Criteria and Results**

There were 6,168 residential regulators tested as part of the Residential Gas Regulator Performance Control Program. No regulators tested as part of the program were excluded from the sample. There were no control groups rejected as a result of the program.

Zero (0) regulators were removed from service as a result of failing the "lock-up" test criteria at the time of the meter sampling exchange.

Table 1 summarizes key program data broken out by control group. The rows in the table listed in red are the control groups where the actual number of sampled regulators did not meet or exceed the required number. Per the Residential Gas Regulator Performance Control Program, the test period for those groups will be extended annually up to a maximum of 10 years until an adequate sample size is gathered. If an adequate sample has not been tested within 10 years, action will be taken the following year to acquire an adequate sampling. The control groups for which an adequate sample size was obtained last year represent approximately 99% of the regulators covered by the Residential Gas Regulator Performance Control Program.

## **Special Project**

In July 2017, LG&E discovered several B42 service regulators failing lock-up tests during their initial installation. The company investigated the issue and it was determined to be a manufacturing issue stemming from the assembly of a specific lot.

Although the B42 regulators in-service perform very well, LG&E made the decision to remove and to replace the suspect lot. LG&E estimates that approximately 1,300 of the B42 regulators from this lot are in service and is working to remove and to replace them. Each of the B42 regulators from the suspect lot, which are installed in LG&E's system, passed a lockup test at the time of installation. Their replacement is a precautionary step.

**Table 1 – Key Program Data by Control Group**

Control Groups		Installed Residential Regulators as of Dec. 31, 2017	Minimum Sample Size	Actual Sample Size	Number Passing Inspection	Number Failing Inspection/ Removed from Service	Reject Failure Level
NATIONAL (or predecessor company)	61	30	8	0	NA	NA	NA
NATIONAL (or predecessor company)	496	30,894	200	672	672	0	74
AMERICAN METER CO.	1803	8	2	0	NA	NA	NA
AMERICAN METER CO.	1883	147	20	3	3	0	1
AMERICAN METER CO.	1213B	54,699	200	894	894	0	98
AMERICAN METER CO.	1813B	264	32	6	6	0	6
BELGAS	P202H	1	1	0	NA	NA	NA
ITRON (or predecessor company)	B31	58	13	1	1	0	1
ITRON (or predecessor company)	B32	3	2	0	NA	NA	NA
ITRON (or predecessor company)	B34	3,774	200	221	221	0	24
ITRON (or predecessor company)	B35	1	1	0	NA	NA	NA
ITRON (or predecessor company)	B42	218,349	200	4,315	4,315	0	475
MOONEY	MOONEY	1	1	0	NA	NA	NA
FISHER	620	1	1	0	NA	NA	NA
FISHER	627	2	2	0	NA	NA	NA
FISHER	730	0	0	0	NA	NA	NA
FISHER	CS400IR	16	8	0	NA	NA	NA
FISHER	CS800IQ	42	12	0	NA	NA	NA
FISHER	CS820IQ	7	22	0	NA	NA	NA
FISHER	HSR	1,852	125	26	26	0	15
FISHER	S102	10	2	0	NA	NA	NA
FISHER	S201	1	1	0	NA	NA	NA
FISHER	S252	36	8	0	NA	NA	NA
FISHER	S302	220	32	30	30	0	6
ROCKWELL	143	1	1	0	NA	NA	NA
<b>OVERALL RESULTS</b>		310,507		6,168	6,168	0	